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ORDEM 3.0 and the Risk of High-Density Debris

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ABSTRACT

NASA's Orbital Debris Engineering Model was designed to calculate orbital debris fluxes on spacecraft in order to assess collision risk. The newest of these models, ORDEM 3.0, has a number of features not present in previous models. One of the most important is that the populations and fluxes are now broken out into material density groups. Previous models concentrated on debris size alone, but a particle's mass and density also determine the amount of damage it can cause. ORDEM 3.0 includes a high-density component, primarily consisting of iron/steel particles that drive much of the risk to spacecraft. This paper will outline the methods that were used to separate and identify the different densities of debris, and how these new densities affect the overall debris flux and risk.